

## SOUTH AUSTRALIAN CAINOZOIC BRYOZOA.—PART I.

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(Communicated by Prof. Walter Howchin.)

[Read September 10, 1936.]

## PLATE XV.

## INTRODUCTION.

At the instigation of Prof. W. Howchin a series of studies on the Cainozoic Bryozoa of South Australia has been commenced. This first contribution deals with material from two horizons in the Cowandilla Bore, *viz.*, 485-507 feet (1) and 520-550 feet (2), and three horizons in the Glanville Bore, *viz.*, 375-400 feet (3), 405-450 feet (4) and 445-490 feet (5) (*vide* Howchin, 1935 and 1936).

The material has yielded three new species and provides interesting stratigraphic and distributional data, particularly in connection with the species *Thalamoporella gracilis* Maplestone, 1900, and *Cellaria variabilis* (Busk, 1884). The type material has been deposited with the South Australian Museum.<sup>(1)</sup>

## LIST OF SPECIES.

- Selenaria maculata* (Busk, 1852). 1, 2, 3.  
*Thalamoporella gracilis* Maplestone, 1900. 1, 2, 4, 5.  
*Thalamoporella howchini*, sp. nov. 1, 2.  
*Cellaria australis* Macgillivray, 1880. 1, 2, 3, 4, 5.  
*Cellaria variabilis* (Busk, 1884). 2, 3, 4, 5.  
*Caberea grandis* Hincks, 1881. 2.  
*Porina gracilis* (Lamarck, 1816). 2, 5.  
*Tubucellaria cereoides gracilis* Canu and Bassler, 1929. 4, 5.  
*Iodictyum cf. phoeniceum* (Busk, 1854). 2, 3, 4.  
*Sertella porcellana* (Macgillivray, 1869). 1, 2, 3, 4, 5.  
*Adeonellopsis australis* Macgillivray, 1886. 1, 2, 3.  
*Parmularia obliqua* (Macgillivray, 1869). 1.  
*Phylactellina cowandillensis*, gen. et sp. nov. 2.  
*Conescharellina angulopora* (Woods, 1880). 4, 5.  
*Conescharellina crassa* (Woods, 1880). 4, 5.  
*Hornera foliacea* Macgillivray, 1869. 1, 2, 3, 4, 5.  
*Hornera robusta* Macgillivray, 1883. 4, 5.  
*Idmonea australis* Macgillivray, 1882. 2, 3, 4, 5.  
*Idmonea macgillivrayi*, sp. nov. 4, 5.

<sup>(1)</sup> The list of references at the conclusion of the paper contains only those references which are mentioned in the text and those which occur more than once in the synonymies of the species, these latter being referred to in the synonymies only by author and date, thus: Livingstone, 1928, p. 111. Where a reference occurs in the synonymy only once, an abbreviated reference is given in the synonymy, thus: Maplestone, 1900, Proc. Roy. Soc. Vic., n.s., vol. xiii, (1) p. 6.

## SYSTEMATIC DESCRIPTION

Family MICROPORIDAE Hincks, 1880.

Subfamily MICROPORINAE Hincks, 1880.

Genus SELENARIA Busk, 1854.

SELENARIA MACULATA (Busk, 1852).

*Lunulites maculata* Busk, 1852, appendix to "Voyage of the *Rattlesnake*" by J. Macgillivray, i, pl. i, figs. 15, 16.*Selenaria maculata* (Busk), Waters 1885, p. 309. Maplestone, 1904, *a*, p. 208; *idem*, 1904, *b*, p. 198; *idem*, 1909, p. 268. Waters, 1921, Journ. Linn. Soc. Zool., vol. xxxiv, p. 417, pl. xxix, fig. 8, pl. xxx, figs. 13-15. Chapman, 1928, p. 148. Stach, 1935, *a*, p. 341.*Observations*—This form occurs in the Lower Miocene and Lower Pliocene of Victoria, and is found at the present day along the continental shelf of eastern and southern Australia (for detailed distribution, *vide* Stach, 1935, *a*).

Family THALAMOPORELLIDAE Levinsen, 1902.

Genus THALAMOPORELLA Hincks, 1887.

THALAMOPORELLA GRACILIS Maplestone, 1900.

(Text fig. 2.)

*Thalamoporella gracilis* Maplestone, 1900, Proc. Roy. Soc. Vic., n.s., vol. xiii, (1), p. 6, pl. ii, fig. 13; *idem*, 1904, *b*, p. 199.*Observations*—This species is unique in the genus in that the avicularium is directed proximally. The zoecial characters of the present specimens are identical with those of Maplestone's form, but the zoarium appears to have been bilaminate at the present locality. The zoecia of this species are very like those of *Thalamoporella elongata* Canu and Bassler, 1935 (*non* Canu, 1917, p. 140) from the Lower Miocene of Bairnsdale, but as these authors do not mention or figure the avicularia, their conspecificity cannot be proved.*Distribution*—Lower Pliocene: Jemmy's Point, Lakes Entrance (Victoria).***Thalamoporella howchini*, sp. nov.**

(Pl. xv, fig. 2.)

*Description*—Zoarium bilaminate. Avicularia arranged in longitudinal series between the vertical rows of zoecia. Zoecia rectangular in outline, less than twice as long as broad, and separated by thick salient ridges. Aperture higher than broad, oval in outline and with inconspicuous hinge teeth; height of aperture equals less than one-third length of zoecium. The adoral areas bear large projecting acropetalous spines of which the diameter equals half the height of the aperture. The two opesiules are unequal in size, the larger being transversely oval in plan and descending to the basal wall, while the smaller is longitudinally oval and appears to reach the lateral wall. The cryptocyst is much depressed below the level of the aperture and is perforated by about twenty fine circular pores. The avicularia are elongate rectangular in outline and equal in length about one and a half times that of the zoecia, their width being about half that of a zoecium. The distal end of each avicularium is acute and slightly recurved, while a well-developed broad cross-bar occurs proximal to the middle line.*Dimensions*—Zoocium, length 0.58 mm., breadth 0.38; aperture, height 0.25, breadth 0.20; spine, diameter, 0.09; avicularium, length 0.85, breadth 0.22.*Type Material*—Holotype: South Aust. Mus. Coll., No. L2. Bilaminate specimen from 485-507 feet in the Cowandilla Bore. Paratype: South Aust. Mus. Coll., No. L3. A fragment from 520-550 feet in the Cowandilla Bore.

*Observations*—In the form of the zoecia, this striking species approaches most closely to the Madagascan *Thalamoporella harmeri* Levinsen, 1909, from which it differs in the greater proportionate width of the zoecia and the much greater proportionate length of the avicularia. This species is readily distinguished by the arrangement of the avicularia, the short zoecia and the well-developed spines of the adoral arca. A specimen referable to this species (paratype) was found at 520-550 feet, but although possessing the characteristic large avicularia with cross-bar, the adoral areas were scarcely developed and the acropetaous spines were absent. This suggests that the latter character is variable within species and probably conditioned by local environmental factors.

Family CELLARIIDAE Hincks, 1880.

Genus CELLARIA Ellis and Solander, 1786.

CELLARIA AUSTRALIS Macgillivray, 1880.

(Pl. xv, fig. 3.)

*Cellaria fistulosa* var. *australis* Macgillivray, 1880, dec. v, p. 48, pl. xlix, fig. 1.

*Salicornaria clavata* Busk, 1884, p. 88, pl. xii, fig. 8.

*Cellaria australis* Macgillivray, 1889, p. 26; *idem*, 1895, p. 29, pl. iii, fig. 19. Maplestone, 1904, b, p. 193; *idem*, 1909, p. 267. Chapman, 1928, p. 147. Livingstone, 1928, p. 115. Stach, 1935, a, p. 342; *idem*, 1936, Proc. Roy. Soc. Vict., n.s., vol. xlix, (1), p. 62.

*Observations*—This species occurs fossil from Upper Oligocene to Lower Pliocene in Victoria and is commonly dredged off the coast from New South Wales around to South Australia (for detailed distribution, *vide* Stach, 1935, a).

CELLARIA VARIABILIS (Busk, 1884).

(Pl. xv, fig. 1.)

*Salicornaria variabilis* Busk, 1884, p. 89, text fig. 7, pl. xii, figs. 3, 9.

*Observations*—This species has been recorded only in the vicinity of Kerguelen Island (southern Indian Ocean), from 25 to 70 fathoms. The present specimens agree in all essential characters with Busk's figures. This form is allied to *Cellaria contigua* Macgillivray, 1895, var. *corioensis* Maplestone, 1901, in the type of avicularium and general form of the zoecia, but differs from it in having a shorter semi-circular aperture and a tendency to the development of rhomboid zoecia.

Family SCRUPOCELLARIIDAE Levinsen, 1909.

Genus CABEREA Lamouroux, 1816.

CABEREA GRANDIS Hincks, 1881.

*Caberea grandis* Hincks, 1881, Ann. Mag. Nat. Hist., ser. 5, vol. viii, p. 2, pl. iii, figs. 4, 4 a-b. Waters, 1887, p. 90. Macgillivray, 1895, p. 25, pl. iii, fig. 9. Maplestone, 1904, b, p. 192; *idem*, 1909, p. 267. Livingstone, 1927, Rec. Austr. Mus., vol. xvi, (1), p. 53. Chapman, 1928, p. 147. Stach, 1935, a, p. 342.

*Observations*—This species occurs in the Lower Miocene and Lower Pliocene of Victoria, and has been dredged at moderate depths (10 to 40 fathoms) in Torres Straits (?) and along the eastern and southern coasts of Australia.

Family PORINIDAE d'Orbigny, 1852.

Genus PORINA d'Orbigny, 1852.

PORINA GRACILIS (Lamarck, 1816).

*Eschara gracilis* Lamarck, 1816, Hist. Nat. An. sans Vert., vol. i, p. 176. Milne-Edwards, 1837, Ann. Sci. Nat., ser. 2, vol. vi, p. 28, pl. ii, fig. 2. Macgillivray, 1880, dec. v, p. 40, pl. xlvi, fig. 3. Busk, 1884, p. 141, pl. xxi, fig. 6.

- Porina gracilis* (Lamarck), d'Orbigny, 1852, Pal. Franc. Terr. Crét., vol. v, p. 434. Macgillivray, 1895, p. 103, pl. xiv, figs. 21, 22. Bassler, 1935, Fossilium Catalogus, pt. 67, p. 175.
- Porina dieffenbachiana* Stoliczka, 1864, Reise der "Novara," geol. Theil, vol. i, (2), p. 135.
- Eschara buskii* Woods, 1876, Proc. Roy. Soc. N.S.W., vol. x, p. 149, figs. 16, 17.
- Porina coronata* Waters (? non Reuss, 1847), 1881, p. 333, pl. xvi, fig. 57; *idem*, 1885, p. 297.
- Porina gracilis* var. *dieffenbachiana* Stoliczka, Macgillivray, 1895, p. 103.
- Haswellia coronata* Levensen (? non Reuss), 1909, Morph. Syst. Stud. Cheil. Bryozoa, p. 299, pl. xvi, fig. 1.
- Acropora gracilis* (Lamarck), Canu, 1913, p. 137. Canu and Bassler, 1920, U.S. Nat. Mus. Bull., No. 106, p. 318, figs. 90 A-E.
- Haswellina coronata* Livingstone (? non Reuss), 1928, p. 120.

*Observations*—The synonymy listed above refers only to the forms recorded from southern Australia and New Zealand (fossil and recent). The Australian form has been regarded as synonymous with *Porina coronata* (Reuss, 1847) from the Lower Oligocene (Priabonian) of Italy by Waters (1881) and others, while Canu (1913) has listed several points of distinction between the two forms. Concerning the latter, it may be remarked that these distinctions could be accounted for by varying degrees of abrasion and normal variation within the species. A critical examination of a large series of specimens is necessary before any conclusions may be drawn.

Further complication in the synonymy, caused by confusing "*Myriozoum australiense*" Haswell, 1880, with this form, was ably dispelled by Busk (1884) and was confirmed by comparison with topotypes from Holborn Island at 20 fathoms.

This species occurs in the Miocene of New Zealand and Victoria and is commonly dredged off the Victorian and South Australian coasts.

#### Family TUBUCELLARIIDAE Busk, 1884.

##### Genus TUBUCELLARIA d'Orbigny, 1852.

##### TUBUCELLARIA CEREOIDES GRACILIS Canu and Bassler, 1929.

*Tubucellaria cereoides gracilis* Canu and Bassler, 1929, p. 355, pl. xliv, figs. 1, 2. Stach, 1935, a, p. 344, pl. xii, fig. 7.

*Observations*—This form appears in the Victorian Lower Pliocene and occurs in the western Pacific and along the south coast of Australia.

#### Family RETEPORIDAE Smitt, 1867.

##### Genus IODICTYUM Harmer, 1933.

##### IODICTYUM cf. PHOENICEUM (Busk, 1854).

*Retepora phoenicea* Busk, 1854, Brit. Mus. Cat., vol. ii, p. 94, pl. cxxi, figs. 1, 2. Macgillivray, 1889, p. 29. Livingstone, 1928, p. 117; *idem*, 1929, Vidensk. Medd. fra Dansk Naturh. Foren., vol. lxxxvii, p. 91.

*Iodictyum phoeniceum* (Busk), Harmer, 1933, Proc. Zool. Soc., London, p. 625; *idem*, 1934, p. 541. Stach, 1935, b, p. 141 (?).

(Not *Retepora phoenicea* Waters, 1887, p. 197, pl. vi, figs. 15, 20 = *I. willeyi* Harmer, 1934; Kirkpatrick, 1890, Sci. Proc. Roy. Dublin Soc., vol. vi, (10), p. 612, = *I. sanguineum* (Ortmann, 1890).

(Not *Schizellozoon phoeniceum* Canu and Bassler, 1929, p. 370, pl. xlvi, figs. 1-5 = *I. projectum* Harmer, 1934).

*Observations*—Three specimens are doubtfully referred to this species, their preservation not permitting certain identification. They are typical *Iodictyum*, but the fenestration of the fragments is more open than in Recent specimens of *I. phoeniceum*. The latter is recorded with certainty from Victoria and South Australia at moderate depths, but Queensland records are dubious. The author (1935, *b*) doubtfully referred a fragment of a zoarium from Green Island (off Cairns) to this species, but better material is necessary to check this. This is the initial fossil record of the genus.

Genus SERTELLA Jullien, 1903.

SERTELLA PORCELLANA (Macgillivray, 1869).

(Pl. xv, fig. 4.)

*Retepora porcellana* Macgillivray, 1869, p. 140; *idem*, 1885, dec. x, p. 15, pl. xcvi, figs. 1-6; *idem*, 1895, p. 115, pl. xv, fig. 15. Stach, 1935, *a*, p. 344.

*Observations*—This species has been recorded from the Lower Miocene and Lower Pliocene of Victoria and is fairly common at the present day along the Victorian coast. The recent work of Harmer (1934) on Reteporidae necessitates the above generic change.

Family ADEONIDAE Jullien, 1903.

Genus ADEONELLOPSIS Macgillivray, 1886.

ADEONELLOPSIS AUSTRALIS Macgillivray, 1886.

(Pl. xv, fig. 5.)

*Adonellopsis australis* Macgillivray, 1886, Trans. Proc. Roy. Soc. Vict., vol. xxii, p. 135, pl. ii, figs. 2, 3. Stach, 1935, *a*, p. 345.

*Observations*—This species occurs in the Victorian Lower Pliocene and is common in dredgings off the Victorian and South Australian coasts.

Family PARMULARIIDAE Maplestone, 1912.

Genus PARMULARIA Macgillivray, 1887.

PARMULARIA OBLIQUA (Macgillivray, 1869).

*Eschara obliqua* Macgillivray, 1869, p. 137.

*Parmularia obliqua* (Macgillivray), Livingstone, 1924, p. 190, pl. xxiii, figs. 1, 2, pl. xxv, fig. 1, pl. xxvi, text fig. 1; *idem*, 1928, p. 119. Stach, 1935, *a*, p. 343, pl. xii, fig. 5.

*Observations*—This species occurs abundantly in most of the deeper water dredgings off the Victorian and South Australian coasts and has been recorded from the Lower Pliocene of eastern (as *Schizoporella flabellata* Maplestone, 1902, p. 68) and western Victoria.

Family PHYLACTELLIDAE Canu and Bassler, 1917.

Genus *Phylactellina*, gen. nov.

Type: *Phylactellina cowandillensis*, sp. nov.

*Description*—Aperture with well-developed lyrule and strongly salient peristome, producing a subcircular peristomic with a somewhat sinuate margin. Upwardly directed avicularia occur on the outer proximal slopes of the peristome. The ovicell is globular, cribriform and opens into the peristome; it rests on the proximal portion of the distal zoecium.

*Observations*—The strongly salient peristome, cribriform ovicell opening into the peristome and the aperture with lyrule place this form in Phylactellidae. From *Phylactella* Hincks, 1880, it differs in the presence of large avicularia on the peristome.

**Phylactellina cowandillensis, sp. nov.**

(Text figs. 1, 1 a-c.)

*Description*—Zoarium massive, eschariform. Zoecia clongate-pyriform in outline, attenuated proximally and separated by salient narrow ridges. The frontal is granular and perforated by fine pores, the marginal areolae being deeply set and widely spaced. Aperture subcircular with a well-developed lyrule. The salient peristome has a broad base and bears a large acute avicularium directed upward on its outer proximal slope and somewhat to one side. Occasionally a smaller acute avicularium also occurs laterally on the peristome. Spatulate avicularia occur rarely on the frontal. The ovicells are globular, wider than high and bear on their summits a circular cribriform area.

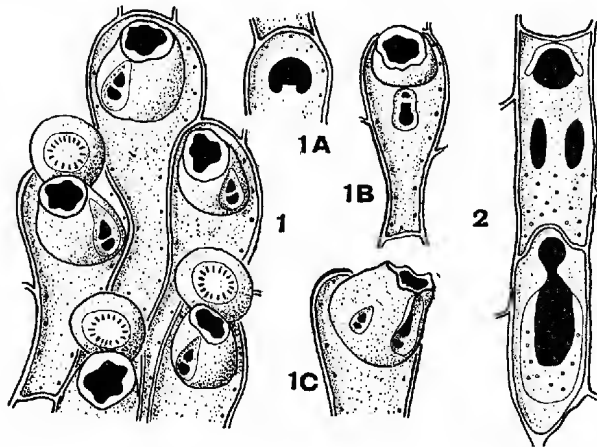


Fig. 1.

Fig. 2.

Fig. 1. *Phylactellina cowandillensis*, sp. nov. Cowandilla Bore at 520 to 550 feet. Holotype, South Aust. Mus. Coll., No. L.4. Portion of zoarium showing ovicelled zoecia and zoecial detail. Fig. 1 a. Zoocidium with abraded peristome, showing form of aperture. Fig. 1 b. Zoocidium with spatulate frontal avicularium. Fig. 1 c. Zoocidium seen partly in lateral view, showing an additional acute avicularium on the peristome.

Fig. 2.

Fig. 2. *Thalamoporella gracilis* Maplestone, 1900. Cowandilla Bore at 520 to 550 feet. Plesiotype, South Aust. Mus. Coll. No. L.8. Zoocidium and proximally directed avicularium.

*Dimensions*—Zoocidium, length 0.85 mm., width 0.24; peristome, basal diameter 0.23; peristomice, diameter 0.13; aperture, diameter 0.12; ovicell, width 0.22, height 0.20.

*Type Material*—Holotype: South Aust. Mus. Coll., No. L.4. Specimen showing ovicells, from 520 to 550 feet in the Cowandilla Bore.

*Distribution*—Cowandilla Bore at 520 to 550 feet.

*Observations*—The holotype shows avicularia on the peristomes of nearly every zoecium, but other specimens from the same material have few peristomes

with avicularia, the zoecia being also often proportionately broader. (Paratype, South Aust. Mus. Coll., No. L 5.)

Family CONESCHARELLINIDAE Levinsen, 1909.

Genus CONESCHARELLINA d'Orbigny, 1852.

CONESCHARELLINA ANGULOPORA (Woods, 1880).

*Lunulites angulopora* Woods, 1880, p. 7, pl. i, figs. 3 a-c.

*Conescharellina angulopora* (Woods), Livingstone, 1924, p. 205; *idem*, 1928, p. 121.

*Observations*—This species has been known previously as a recent form from the coasts of south-eastern Australia. Macgillivray's doubtful record of its occurrence in the Lower Miocene of Victoria (1895) may be disregarded.

CONESCHARELLINA CRASSA (Woods, 1880).

*Lunulites (Cupularia) crassa* Woods, 1880, p. 5, pl. i, fig. 1.

*Conescharellina crassa* (Woods), Livingstone, 1924, p. 212.

*Observations*—The occurrence of this form is similar to that of *C. angulopora*.

Family HORNERIDAE Gregory, 1899.

Genus HORNERA Lamouroux, 1821.

HORNERA FOLIACEA Macgillivray, 1869.

*Hornera foliacea* Macgillivray, 1869, p. 142. Busk, 1887, p. 17. Macgillivray, 1895, p. 127, pl. xix, fig. 1.

*Observations*—This species occurs in the Victorian Lower Miocene and is commonly dredged off Victoria and South Australia, numerous specimens being observed in the dredgings taken by Sir Joseph Verco.

HORNERA ROBUSTA Macgillivray, 1883.

*Hornera robusta* Macgillivray, 1883, Trans. Proc. Roy. Soc. Vict., vol. xix, p. 291, pl. i, fig. 1; *idem*, 1886, dec. xii, p. 72, pl. cxviii, figs. 6-8.

*Observations*—This species occurs commonly off the Victorian coast, but this is its initial record as a fossil.

Family TUBULIPORIDAE Johnston, 1838.

Genus IDMONEA Lamouroux, 1821.

IDMONEA AUSTRALIS Macgillivray, 1882.

*Idmonea australis* Macgillivray, 1882, dec. vii, p. 30, pl. lxxviii, fig. 2. Busk, 1887, p. 12, pl. iii, fig. 3.

*Observations*—This species is recorded fossil for the first time. At the present day, it is found from Port Jackson around the coast to South Australia.

*Idmonea macgillivrayi*, sp. nov.

(Text fig. 3.)

*Idmonea milneana* Macgillivray (*non* d'Orbigny, 1839), 1882, dec. vii, p. 29, pl. lxxviii, figs. 1, 1 a, b.

(Not *Platonea scalaria* Canu and Bassler, 1922, p. 49, pl. xi, figs. 1-5.)

(Not *Diaperoecia scalaria* Canu and Bassler, 1929, p. 537, pl. lxxxix, figs. 3-7.)

*Observations*—Canu and Bassler recognise that Macgillivray's figured

specimen is incorrectly referred to *I. milncana*, but they place his form with their Philippine species, *I. scalaria*. The southern Australian form, however, differs from both Atlantic and Philippine forms in being much more robust and having four or five zoecial tubes to each alternating fascicle, instead of two to four.

*Dimensions*—Width of branch 2.1 mm.; zoecium, length 0.6-0.8, width 0.25-0.30; aperture, diameter 0.18-0.22.

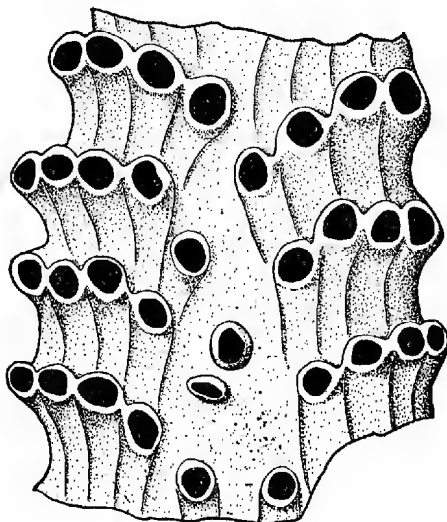


Fig. 3.

*Idmonca macgillivrayi*, sp. nov. Glanville Bore at 415 to 445 feet. Plesiotype, South Aust. Mus. Coll., No. L11. Portion of branch showing oocciostome.

#### CONCLUSIONS.

Apart from the species described as new, all the forms are known to be living at the present day, except *Thalamoporella gracilis* Maplestone, 1902, which has been recorded previously only from the Lower Pliocene (Kalinman) of Jemmy's Point, Lakes Entrance (Victoria). A recent study of a Lower Pliocene bryozoan faunule from Hamilton (Victoria) (Stach, 1935, *a*) revealed only one species ranging from Miocene to Pliocene, and one new species, *Otionella grandipora*, which has since been found in dredgings from off Beachport (South Australia). The lack of typical Miocene forms and the recent aspect of the faunules fixes the age as later than Miocene, while the occurrence of *Thalamoporella gracilis* suggests that the faunule is Pliocene. The faunule is consistent with an Upper Pliocene age as far as our present knowledge can be applied, since no restricted Miocene form has been found, while in the Lower Pliocene, as noted above, one such species has been recorded.

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## ACKNOWLEDGMENT.

Thanks are due to Mr. H. Marriott, of the Anatomy Department, University of Melbourne, for the photographic illustrations.

## EXPLANATION OF PLATE XV.

## BRYOZOA FROM COWANDILLA BORE, S.A.

- Fig. 1. *Cellaria variabilis* (Busk, 1884). Cowandilla Bore at 520 to 550 feet. Plesiotype, South Aust. Mus. Coll., No. L7.
- Fig. 2. *Thalamoporella howchini*, sp. nov. Cowandilla Bore at 485 to 507 feet. Holotype, South Aust. Mus. Coll., No. L2.
- Fig. 3. *Cellaria australis* Macgillivray, 1880. Cowandilla Bore at 485 to 507 feet. Plesiotype, South Aust. Mus. Coll., No. L6.
- Fig. 4. *Sertella porcellana* (Macgillivray, 1869). Cowandilla Bore at 485 to 507 feet. Plesiotype, South Aust. Mus. Coll., No. L9.
- Fig. 5. *Adeonellopsis australis* Macgillivray, 1886. Cowandilla Bore at 485 to 507 feet. Plesiotype, South Aust. Mus. Coll., No. L10.